Met. Support Group

- Paul Newman (NASA/GSFC)
- Leslie Lait (SSAI/GSFC)
- Lenny Pfister (NASA/ARC)
- Rennie Selkirk (**SPRI/ARC)**

I.Products

1. Met data/flight planning support
2. Exchange files (met curtains, trajectories)

II.Science

1. Comparisons
   a. Coincident
   b.Non-coincident (PV-theta)
2. Ozone loss
3. Ames activities

Products

Main service: flight planning aids

- Look for interesting air to fly in (or places to avoid)

Forecasts, Analyses : NCEP, GSFC DAO

- Plots (http://code916.gsfc.nasa.gov/Missions/SOLVE2/)
- Exchange files (data curtains of T,U, V, EPV, Z)
- Automailer (plots, data curtains, etc.)

Ames Products:

- Rel. Humidity forecasts/analyses
- Trajectory-based calculation of Rel.Humidity
- Comparison w/ AVHRR satellite imagery

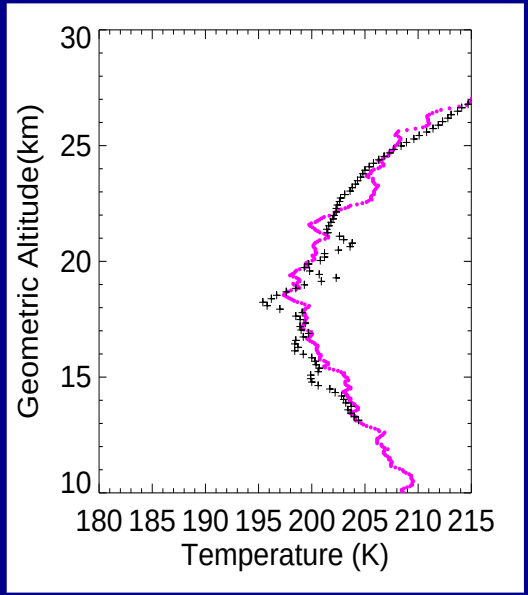
Trajectories: GSFC

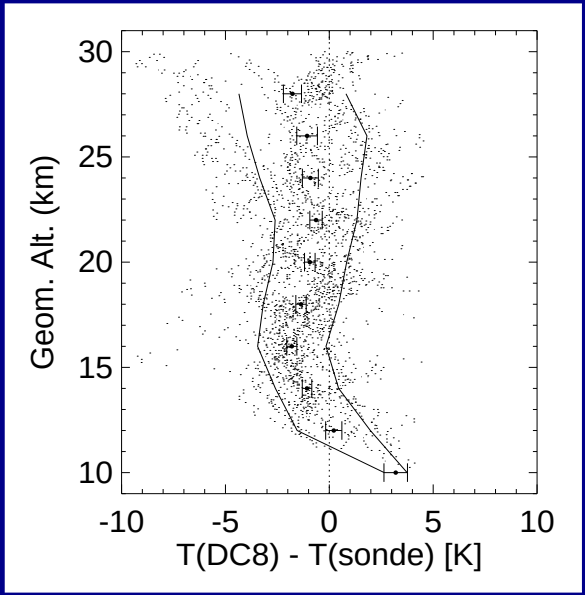
- Exchange files
- Automailer (http://code916.gsfc.nasa.gov/Data_services /automailer/) (user: "Ertel", password:"geostrophic")

Science Goals

- use met data to characterize & compare measurements
- work with AROT*L & other groups to intercompare measurements
  - coincident comparisons
  - non-coincident comparisons
- examine long-term met statistics (e.g., was anything unusual about Jan. 2003?)

Coincident comparisons





Compare Temperature, Ozone data from AROTEL, Sondes

Look at: Overall mean, std. dev., PDFs within altitude bins

Non-coincident Cmp.

I.Probability Distribution Functions (PDFs)

- Histograms of constituent amounts
- Analyses at different theta levels
- 2-D PDFs in PV-theta space
- (account for sampling differences)

II. PV-theta analysis

- Map one instrument's data onto another instrument's locations
- Directly compare PV-theta composites
- Construct & compare stats in PV-theta space

III. Trajectory Mapping

- Trace measured parcels
- Accumulate parcels until field is filled-in

PV-Theta Analysis

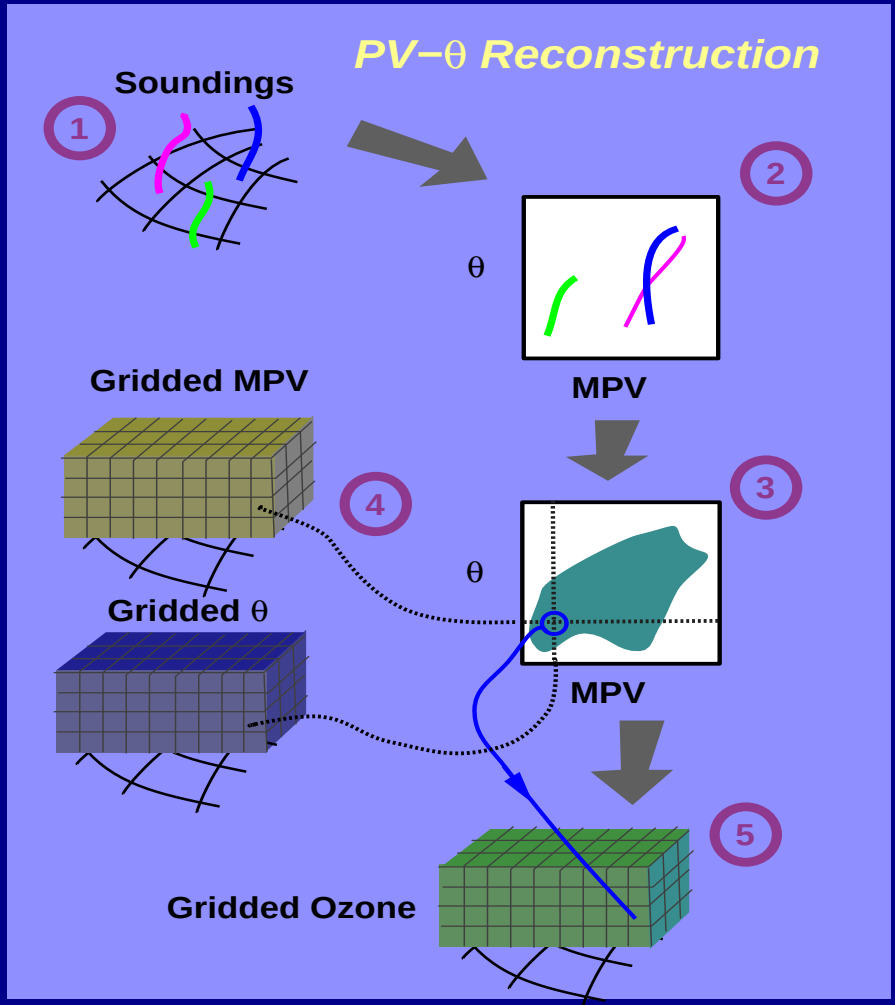
1. Raw data

2. Data in PV-theta coords

3. Combine data into composite in PV-theta space

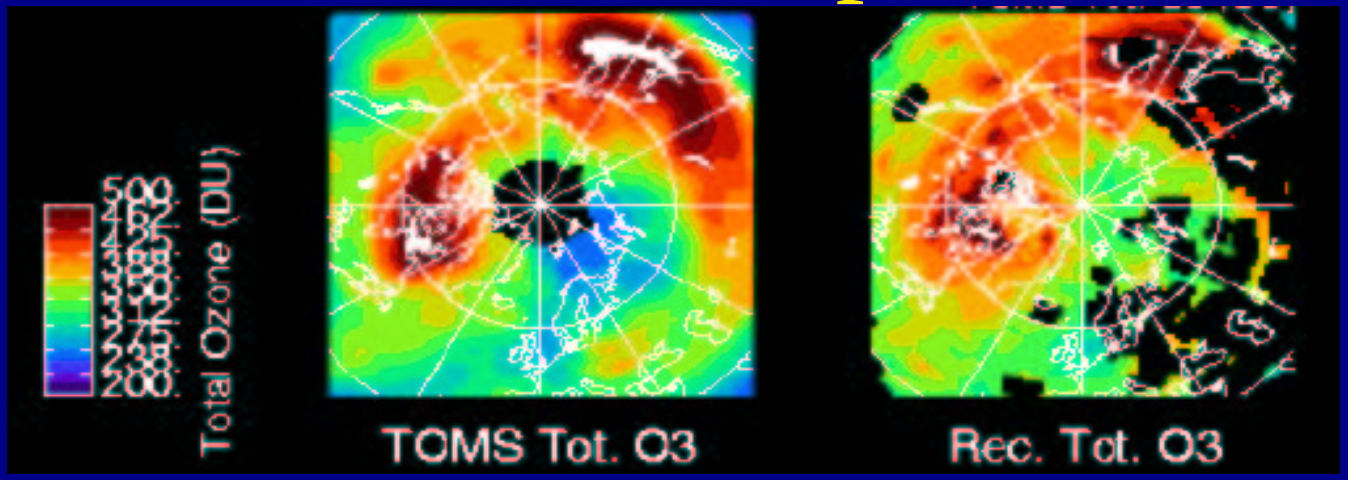
4. Use gridded met fields to look up constituent value in PV-theta space

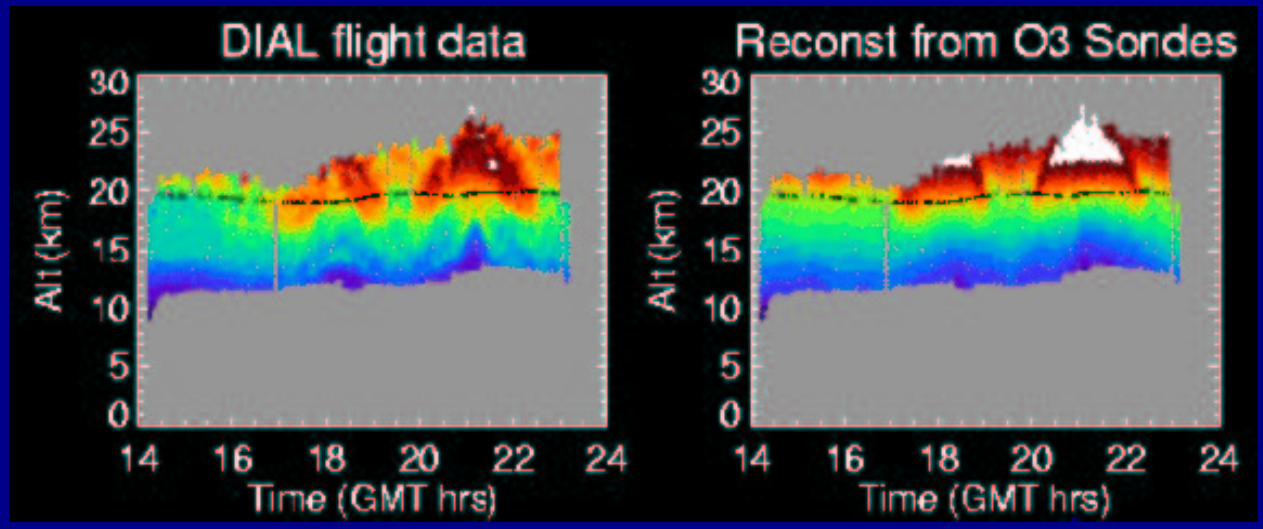
5. Map constituent value into real space



L. Lait, SOLVE-2 Science Team Meeting, 2002-12-11

PV-theta Examples





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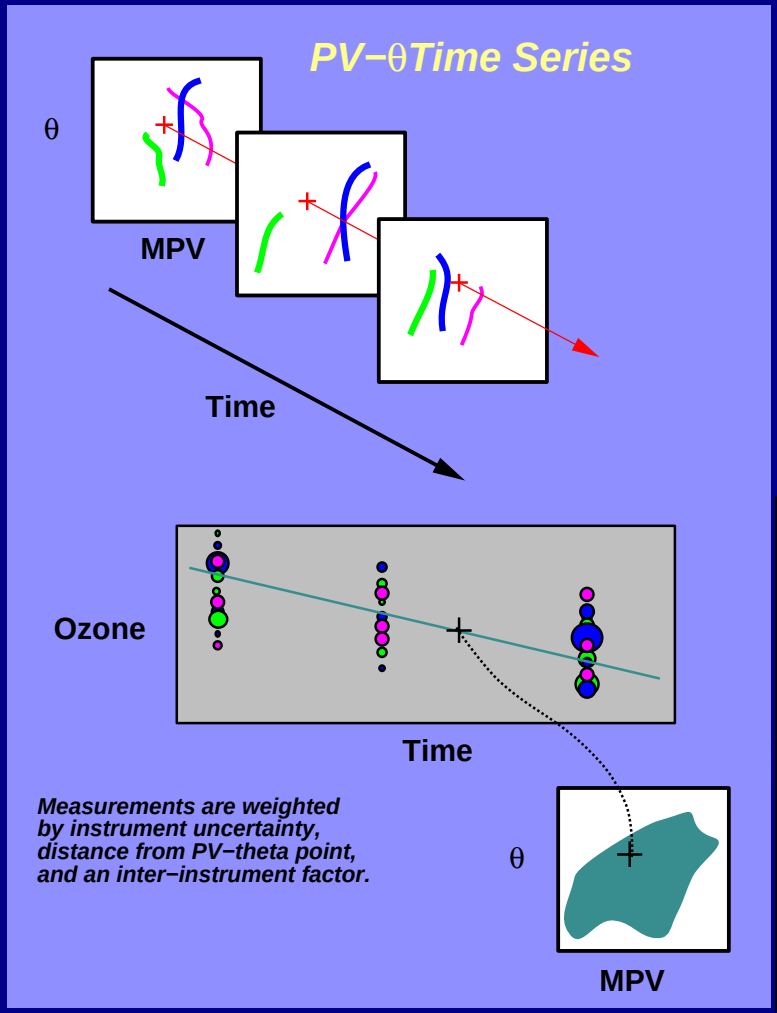
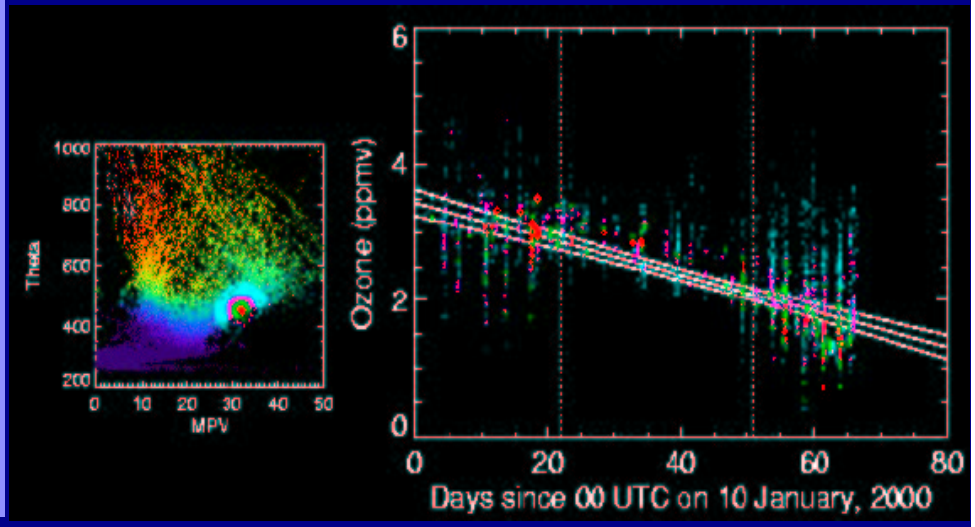
Ozone Loss



- Determine O3 change rate in PV-theta space
- Correct for diabatic effects
- How accurate over one month?



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Ames Activities

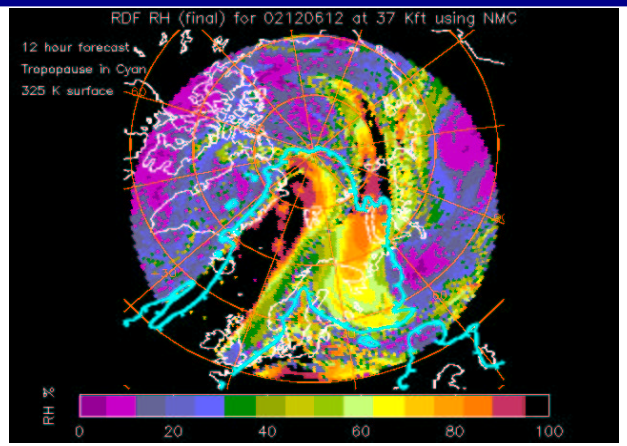
I. Flight level info (~ 3 day forecast)
- A. Motivation
  - 1. Cloud effect on lidar ops (flights below trop)
  - 2. Science issues: water vapor, clouds, & dehydration in the tropopause region
- B. Products
  - 1. Analyses/forecasts of Rel.Humidity & tropopause
  - 2. Trajectory-based calculations of Rel.Humidity (removes water vapor exceeding parcel saturation)
  - 3. Comparison w/ AVHRR satellite imagery

II. Surface Weather updates for science team (~3 day forecast)
- A. Generally not a problem (no SOLVE-1 weather scrubs)
- B. Alert if low ceilings/low visibility/strong winds expected

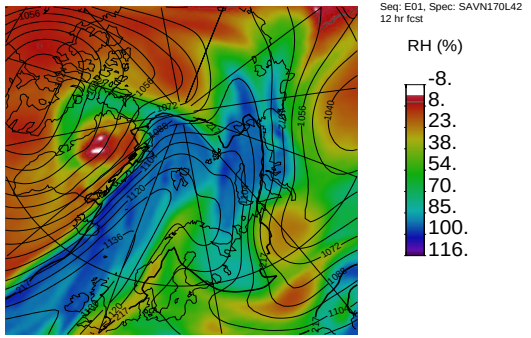
Ames Activities (cont.)

Note:

- Regions near Kiruna below trop
- Some of these regions have high R.H. & may be cloudy
- Both model & traj calc show high R.H. where sat shows high cloud

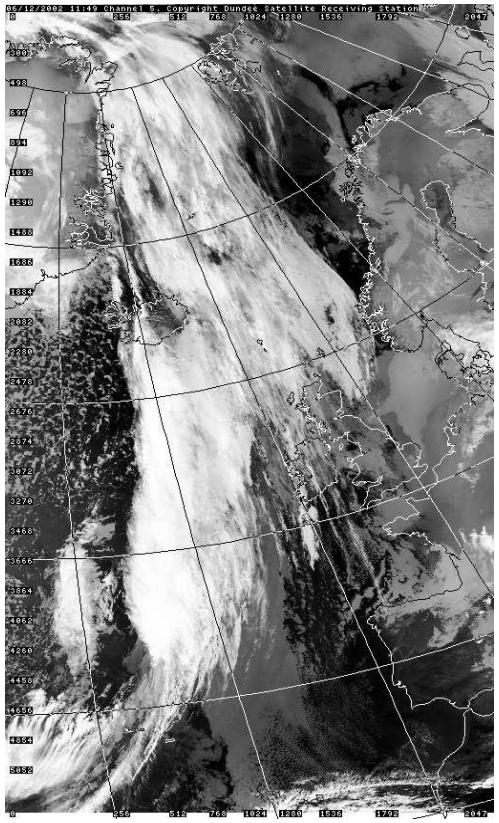


Trajectory-based RH at ~FL370



NASA GSFC

Model RH 12-hr forecast at ~FL370



AVHRR channel 5 (12 μm) – 6 Dec 1149 UT

Summary

- The Goddard/Ames group will provide numerous products to aid in data interpretation and flight planning
- Goddard will help the AROTEL team (and any other interested groups) to compare measurements
  - Coincident data
  - Non-coincident data
- Ames will calculate and verify potential for cloudiness affecting lidar operations